

## REMARKS

The above-identified application is United States application serial number 10/713,515 filed on November 11, 2003. Claims 1-12 and 29-39 are pending in the application. Claims 1-12 and 21-39 are rejected under 35 U.S.C. 103(a) as obvious over the publication entitled "Sonic Boom Minimization With Nose-Bluntness Relaxation" by Christine M. Darden, NASA Technical Paper 1349, pp. 1-51 (NASA 1979) (hereinafter "Darden") in view of Makino or Howe. Applicant respectfully traverses these rejections and submits that the features set forth in the claims are not disclosed, suggested, or obvious in view of the cited references.

### *Rejection of Claims Under 35 USC 103(a)*

"To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." MPEP § 2143. In the present case, Darden, alone or in combination with Makino and/or Howe, do not teach or suggest all the claim limitations, nor is there any motivation or suggestion to modify the teachings of the cited references to provide the claimed features.

Darden discloses a method for compromising between sonic boom levels and prohibitive drag penalties by defining the proper ratio of the length of the conical nose region of the equivalent area distribution ( $y_f$ ) to the overall length of the aircraft ( $l$ ). (See Darden, p. 13, Concluding Remarks). Darden's analysis teaches relaxing the bluntness of the nose to reduce drag. (Darden, Introduction). This is achieved by controlling the bluntness of the area distribution of the nose, and thereby the drag of the nose. (Darden, p. 5 and p. 13). Darden only teaches relaxing the bluntness of the nose, not relaxing a design constraint to allow the equivalent area distribution curve of the aircraft (not just the nose) to be at or below the equivalent area distribution goal curve, as set forth in independent Claim 1.

On page 3 of the Office Action, the Examiner states that it would have been obvious to one skilled in the art at the time to have expanded the steps of Darden to analyze and design the whole aircraft as taught by Makino or Howe. However, even if Darden, Howe, and/or Makino are combined, the references still fail to teach all the limitations in the claims.

On page 2 of the Office Action dated January 12, 2006, the Examiner states that the ideal equivalent area distribution goal curve is what one skilled in the art would want. The Examiner further states that relaxing a design constraint is what one skilled in the art would do to design an optimally performing aircraft. Applicant asserts that if one wants to achieve the ideal equivalent area distribution goal curve, then it would be inconsistent to relax a design constraint to allow a design to have an equivalent area distribution that is below the ideal. Indeed, prior to Applicant's development, aircraft designers were stringently constrained by the ideal distribution goal curve to minimize sonic boom. Applicant is not aware of any efforts or suggestions that proposed relaxing the ideal distribution goal curve constraint over the length of the aircraft to expand the realm of possible design configurations for supersonic aircraft. While Darden taught relaxing the bluntness of the nose, prior to Applicant's development, the goal was for the rest of the aircraft to meet the ideal distribution goal curve.

Independent Claim 1 is allowable for at least these reasons.

Independent Claim 29 requires "redistributing lift of a wing by configuring the wing with areas of far-field expansion ahead of areas of far-field compression." Darden is only concerned with the shape of the nose bluntness and does not even mention expansion and compression areas on the wing. Rather, Darden confines configuration changes to the fuselage forebody to determine the tradeoff between drag penalty and sonic boom disturbances. (Darden, p. 13). Claim 29 is allowable for at least this reason.

Claims 2-12 and 30-39 depend from Claims 1 and 29, respectively, and include features that further distinguish them from the prior art.

For example, Claim 2 includes "segmenting a wing of the aircraft into panels; analyzing the flow characteristics for each panel; and smoothing the configuration of each

panel with adjacent panels along the span and the chord of the wing to smooth the wing surface.” Claim 3 includes “determining design variables at the root and the tip of a wing of the aircraft along Mach angle lines ( $X - \text{Beta} \cdot R$ ).” Claim 4 includes “determining an incidence angle for a wing root of the aircraft for maximum lift-to-drag and connection to a fuselage; and determining the shape of the remaining portions of the wing for maximum lift-to-drag. The Examiner states that Darden teaches these features, but does not provide page numbers to support the assertions. Applicant has read the Darden reference several times and has not found any sections that teach the features of Claims 2, 3, or 4. Applicant thus submits that Claims 2, 3, and 4 are allowable.

With regard to Claims 5, 33, 6, 7, 35, 10, 38, 11, and 39, on page 3 of the Office Action, the Examiner states that one skilled in the art would have taken the steps set forth in the claims to design an aircraft. Applicant respectfully traverses the rejection of Claims 5, 33, 6, 7, 35, 10, 38, 11, and 39 based on the Examiner’s assertion that the features as specifically set forth in Claim 5, 33, 6, 7, 35, 10, 38, 11, and 39 are well known in the art and/or inherent. Citation to references in support of this position is requested in the event Claim 5, 33, 6, 7, 35, 10, 38, 11, and 39 are still not considered allowable.

#### ***Request for Further Rationale of Rejections***

The Examiner did not cite specific portions of Darden, Makino, or Howe to support rejection of the claims. Applicant respectfully requests further explanation and citations to relevant portions of the references to support the Examiner’s position for each claim if the claims are still rejected.

#### **CONCLUSION**

Applicant believes Claims 1-12 and 29-39 are in form for allowance and a notice to that effect is solicited. In the event it would facilitate prosecution of this application, the Examiner is invited to telephone the undersigned at (949) 251-0250.

I hereby certify that this correspondence is being transmitted to the USPTO, on the date shown below:

/Mary Jo Bertani/  
(Signature)

Mary Jo Bertani  
(Printed Name of Person Signing Certificate)

April 12, 2006  
(Date)

Respectfully submitted,

/Mary Jo Bertani/

Mary Jo Bertani  
Attorney for Applicant(s)  
Reg. No. 42,321